

to 2000 miles, with a breadth or depth of 20 miles, peaks above 5 miles high, distributed throughout *its whole extent*, and passes similarly extended, *yet seldom or never falling below 15,000 feet*; and all this though we admit Humboldt's somewhat theoretic negation of the general opinion, that Hemachal, and not, as he contends, Kuenlun, is the chain which divides Asia from end to end!

III. ZOOLOGY.

1. *Synopsis of the Genera of Gammaracea*; by JAMES D. DANA.—The tribe of Amphipoda among Crustacea includes the subtribes Gammaracea and Hypericea. The former of these subtribes consists of six groups or families.

Fam. 1. ORCHESTIDÆ. Saltatoriæ. Palpus mandibularis obsoletus. Corpus compressum, epimeris latis. Styli caudales duo postici breviores.

Fam. 2. GAMMARIDÆ. Saltatoriæ vel natatoriæ. Mandibulæ palpi-geræ. Corpus sæpius compressum. Antennæ flagello confectæ, non pediformes. Styli caudales duo postici sive longi sive breves.

Fam. 3. COROPHIDÆ. Gressoriæ. Corpus plus minusve depressum, lineare, abdomine recto, normali, epimeris angustissimis vel obsoletis. Mandibula palpigera. Antennæ pediformes.

Fam. 4. ICILIDÆ. Corpus depressum, latum, abdomine normali, inflexo, pedibus latè expansis instar Araneæ. Antennæ non pediformes.

Fam. 5. CHELURIDÆ. Corpus vix compressum. Abdomen abnormale, segmentis duobus tribusve coalitis et irregularibus; stylis caudalibus sex, dissimilibus. Antennæ breves pediformes.

Fam. 6. DULICHIDÆ. Isopodis affines. Corpus depressum, lineare. Antennæ pediformes. Abdomen abnormale, 5-articulatum, stylis duobus. Antennæ pediformes. Pedes tertii quartique breves, sex sequentes elongati, Caprelliformes.

In the following synopsis, the synonymy is included only so far as it is not contained in the work on Crustacea by Milne Edwards (Paris, tome iii, 1840); copious notes also are added. The number of new genera introduced since 1840 is quite large, and a few are instituted from the collections by the writer in the Exploring Expedition.*

We add a word on a single point in the distinctions of genera. The size of the hands among the Orchestidæ and Gammaridæ has often been deemed to some extent an important generic character. But it is now well known that the gradations in the same group are imperceptible, and farther, females may have minute and hardly prehensile feet, while in males of the same species the corresponding hands are quite large. On this ground, Fr. Müller has lately denied the propriety of separating the Orchestiæ, and Talitri (Archiv für Naturg., 1848, p. 53). There is however a wide difference between the species having a styliform joint terminating the *second pair* of legs and those with a hand however minute or obsolescent. The only safe course appears to the writer to consist in drawing the line between *species having a finger or claw however small or large, closing upon the fifth joint*, and those *species having an extended finger or claw not closing up*. Krøyer's *Anonyx*, according to his descrip-

* The Crustacea of the Exploring Expedition under Captain Wilkes will form a volume of text in 4to, accompanied with figures of all the species in a folio atlas. Brief descriptions will from time to time appear in the Proceedings of the American Academy of Arts and Sciences of Boston, part of which, relating to the Entomostraca and including upwards of 150 species, has already been published. The number of new species of Amphipoda in the collections exceeds eighty.

tion, has the 4 anterior feet non-prehensile; but in his figures, these feet are sub-prehensile though minute, and they resemble in this, many *Amphitoe*, *Orchestia*, and *Allorchestes*. The two anterior feet of the *Talitri* vary widely, from an obsolescent hand to a large strong prehensile form. Here as elsewhere in nature, there is no saltus in the gradations to aid us in generic groupings.

The larger part of the new genera recently added, have been instituted by Kröyer from species obtained in high northern latitudes. It is remarkable that the form in this tribe should be so greatly varied in the colder seas, and confined to so few genera in tropical latitudes.

FAM. I. ORCHESTIDÆ.

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| 1. Pedes secundi non subcheliformes. Antennæ superiores basi inferiorum breviores. | <i>Talitrus</i> (Latreille). |
| 2. Pedes primi secundique subcheliformes. Antennæ superiores basi inferiorum breviores. Maxillipedes ad apicem obtusi. | <i>Orchestia</i> (Leach). |
| 3. Pedes primi secundique subcheliformes. Antennæ superiores breviores, basi inferiorum longiores. Maxillipedes ad apicem unguiculati. | <i>Allorchestes</i> (Dana.*) |

FAM. II. GAMMARIDÆ.

SUB-FAM. I. LYSIANASSINÆ.

Antennæ superiores ad basin crassæ. Epimera grandia. Pedes sex postici non prehensiles.

I. Pedes subcheliformes nulli, secundis interdum exceptis.

a. *Pedes quinti sexti septimique directione similes.*

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| 1. Antennæ superiores appendiculatæ. | <i>Lysianassa</i> (M. Edw.). |
| 2. Antennæ superiores non appendiculatæ. | <i>Phlias</i> (Guérin). |

b. *Pedes quinti tertii quartique directione similes.*

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| 1. Antennæ sup. appendiculatæ. Palpus mandibularis 1-articulatus. | <i>Stegocephalus</i> † (Kröyer). |
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II. Pedes primi subcheliformes, secundi non subcheliformes; reliqui non prehensiles.

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| 1. Antennæ sup. appendiculatæ. | <i>Opis</i> ‡ (Kröyer). |
| 2. Antennæ sup. non appendiculatæ. Pedes secundi vergiformes; tertii quartique brevissimi. | <i>Uristes</i> (Dana). |

III. Pedes primi secundique subcheliformes, reliqui non prehensiles.

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| 1. Antennæ sup. appendiculatæ. | <i>Anonyx</i> § (Kröyer). |
| 2. Antennæ sup. non appendiculatæ. | <i>Stenia</i> (Dana). |

* The species of this genus have the aspect of many *Amphitoe*, and have probably been hitherto referred to that genus. They have the very short posterior stylets of the *Orchestiæ*, and resemble them in habit, and in the absence of a palpus to the mandible; while they differ in having the superior antennæ longest and in the stout spine or claw terminating the maxillipeds. The writer has dissected the mouth of nearly a dozen species of *Allorchestes*.

† Kröyer's *Naturhistorisk Tidsskrift*, (Copenhagen,) iv, 150, 1842. "Caput oculis, ut videtur, destitutum." "Antennæ breves (capitis altitudine non longiores)." "Pedes quinti paris pedibus tertii quartique paris structurâ et directione similes."

‡ *Tids.*, iv, 149. "Pedes primi paris chelis armati portentosæ magnitudine. Reliqua cum genere *Anonyce* fermè conveniunt."

§ *Tids.*, ii, 256 and iv, 164. This genus is united with *Lysianassa* by Milne Edwards. Any species wholly without hands are properly *Lysianassæ*; those with only two anterior hands, however minute or imperfect, belong to *Opis*.

IV. Pedes tertii quartique subcheliformes.

1. Antennæ sup. appendiculatæ. Pedes tertii quartique validi, articulo quarto dilatato instar palmæ, ungue conico, aculeato.

*Pontoporeia** (Kröyer).

SUBFAM. II. GAMMARINÆ.

Antennæ superiores ad basin tenues. Epimera sive grandia sive angusta. Pedes 6 postici non prehensiles.

I. Pedes subcheliformes nulli, secundis parvulis interdum exceptis.

1. Antennæ superiores appendiculatæ.

Alibrotus (M. Edw.).

2. Antennæ sup. non appendiculatæ.

Acanthonotus (Owen).

II. Pedes primi subcheliformes, secundi non subcheliformes, reliqui non prehensiles.

1. Antennæ sup. appendiculatæ.

Leptochirus† (Zaddach).

III. Pedes primi secundique subcheliformes, reliqui non prehensiles.

A. *Antennæ secundæ subtus primas insitæ.*

* Digiti toti uni-articulati.

a. *Pedes sex postici similes.*

1. Antennæ sup. appendiculatæ.

Gammarus‡ (Fabr.).

2. Antennæ sup. non appendiculatæ.

Amphithoe§ (Leach).

* Tids. iv, 152. "Pedes primi et secundi paris perbreves, robusti; illi manu latâ instructi ungue vero brevior; hi manu carentes ungueque præditi rudimentari. Pedes tertii quartique paris longiores, validi, subcheliformes, articulo quarto dilatato palmam efficiente, ungue armati conico, aculeato. Pedes quinti et sexti paris recurvi, articulo primo parum modo dilatato ungue armati perpusillo. Pedes septimi paris recurvi, articulo primo permagno, clypeiformi; articulo sexto vel ungue rudimentari. Epimera magna."

† Syn. Crust. Pruss. Prodromus, 1844. This genus is stated to be allied to *Amphithoe*.

‡ From the genus *Gammarus*, Leach separates:—

MÆRA (Edinb. Encyc., vii, 403; Trans. Linn. Soc., xi, 359.) Manus secundæ valde inæquæ, majore bene cheliformi.

MELITA (Edinb. Encyc., vii, 403.) Digitus pedum secundi paris in latus manûs claudens.

The *Amathia* of Rathke (Fauna der Krym, Mem. Acad. Imp. St. Petersburg, iii, 1837, p. 291, and Beit. zur Fauna Norwegens, Act. Leop., xx Bd.) includes those *Gammari* which have the superior antennæ shortest—apparently an unimportant distinction.

§ *Amphithoe* includes the *Dexamine* and *Pherusa* of Leach. *Eusirus* of Kröyer (Tids., N. R., i, 501,) is somewhat peculiar in the form of the hands, but the gradations among the species are such that the character is not sufficient even for a subgenus.

Kröyer's *Microcheles* (Tids., N. R., vol. ii,) is also near *Amphithoe*. The principal point of difference mentioned is the absence of the molar prominence from the mandible. The *small hands* to which the name alludes is common to many *Amphithoes*, especially females.

The *Iphimedia* of Rathke (Beit. zur Fauna Norwegens, p. 85; Act. Leop., Bd. xx) appears to differ little from *Amphithoe*. The superior antennæ are shorter than the inferior, and this characterizes generally the species from the higher latitudes. *Acanthosoma* of Owen (Ross's 2d voyage to the north in 1829–1833, Append., p. xci) has the same characters. The description of *Iphimedia* by Rathke is as follows—p. 89. "Antennæ superiores inferioribus breviores; illarum pedunculus e tribus, harum e quatuor articulis, compositus: omnium flagellum tenue, multiarticulatum. Pedes secundi paris manibus simplicibus, primi paris, illis minores, chelis instructi, quarum pollex ex uno tantum articulo constat. Reliqui pedes iis *Gammarorum* similes. Pedes spurii in duos ramos plus minusve complanatos divisi."

b. *Pedes sex postici non similes.*

1. Pedes quinti recurvati, inversi, ungue rudimentari. Antennæ sup. non appendiculatæ. *Photis** (Kröyer).

2. Pedes septimi longissimi, tenues, fere filiformes. Antennæ sup. non appendiculatæ. Frons in rostrum producta. *Ædicerus†* (Kröyer).

† Duo quatuorve digiti bi-articulati.

1. Pedes primi digitorum bi-articulati. Antennæ sup. non appendiculatæ. *Leucothoe* (Leach).

2. Pedes secundi digitorum bi-articulati. *Erichthonius* (M. Edw.).

3. Pedes primi secundique digitorum bi-articulati. Antennæ tenues, sup. appendiculatæ. *Pardalisca‡* (Kröyer).

B. *Antennæ secundæ post primas insitæ, fronte in rostrum productâ.*

1. Digiti uni-articulati. Pedes 6 postici similes. Antennæ anticæ appendiculatæ. *Ischyroceras* (Kröyer).

IV. Pedes tertii quartique prehensiles ; sequentes non prehensiles.

A. *Antennæ secundæ subtus primas insitæ.*

1. Manus tertiæ quartæque simplicissimæ, pollice instructæ. Digiti uni-articulati. Antennæ sup. appendiculatæ. *Lepidactylis§* (Say).

2. Manus tertiæ quartæque articulis tertio quartoque instructæ, et digiti articulis sequentibus coalitis. Corpus subdepressum. Antennæ sup. appendiculatæ. *Protomedeia||* (Kröyer).

3. Manus tertiæ quartæque articulo tertio instructæ, et digiti articulis sequentibus junctis, articulo ultimo longissimo, gracillimo. Antennæ graciles. Epimera magna. *Ampelisca¶* (Kröyer).

4. Manus tertiæ quartæque articulo quarto instructæ, et digiti articulis quinto sextoque. Corpus subdepressum. Antennæ sup. appendiculatæ ; inf. subpediformes. Pedes primi secundique subcheliformes. *Aora*** (Kröyer).

* Tids., iv, 155. "Corpus sat altum, compressum. Antennæ subpediformes flagello appendiculari destitutæ." "Epimera permagna ; quinque paria anteriora ad marginem inferiorem setis sat longis instructa ; quintum eadem est ac quartum altitudine, postice profundius excisum."

† Tids., iv, 155. "Frons in rostrum producta, plus minus acutum obtusumve, semper vero nodo pellucente, ovali, flavo rubescente, turgidum. Oculi nulli?" "Pedes primi et secundi paris manu armati subcheliformi permagna. Pedes tertii, quartique paris validi, ungue instructi lato, laminari ; quod quoque usu venit quinto sextoque pari, quorum articulus primus dilatatus non est." "Epimera mediocris magnitudinis."

‡ Tids., iv, 153. "Caput crassiusculum, subtumidum. Epimera exiguæ magnitudinis." "Pedes tertii quartique paris ungue sublaminari, posticè subtiliter serrulato. Pedes reliqui elongati, sat debiles, femoribus subangustis."

§ Jour. Acad. Nat. Sci. of Philadelphia, i, 380. Superior antennæ appendiculate, shorter than the inferior pair.

|| Tids., iv, 154. "Antennæ inferiores pediformes, pedunculo longissimo, flagellum ter ad minus longitudine superante. Pedes secundi paris parvi, manu non instructi subcheliformi." "Epimera sat brevia."

¶ Tids., iv, 154. "Pedes primi secundique paris nulla instructi manu subcheliformi." "Pedes quinti sextique paris articulis modo compositi quinque, quorum ultimus ad finem marginis posterioris ungue armatus est rudimentari, recurvo, immobili (vel parum mobili). Septimum pedum par ungue laminari, lato, natatorio (?) "Oculi simplices (?) "Epimera magna." "Sextum pedum abdominalium par natatorium. Reliqua ut in genere Amphithoe."

** Tids., N. R., i, 328, 1845. "Quintum pedum par brevissimum, robustum ; sextum par septimumque quinto multo longiora sed graciliora." "Pedes abdominales quarti, quinti et sexti paris saltatorii."

B. *Antennæ secundæ post primas insitæ, fronte in rostrum productâ.*

1. Manus tertiæ quartæque articulis tertio quartoque instructæ, et digiti articulis sequentibus coalitis. Antennæ anticæ appendiculatæ, breves. Pedes primi secundique subcheliformes.

*Phoxus** (Kröyer).

SUBFAM. III. ISÆINÆ.

Pedes sex quatuorve postici subprehensiles.

A. *Antennæ secundæ subtus primas insitæ.*

1. *Gammaro* similis. Pedes decem postici similes. Antennæ sup. appendiculatæ.

Isæa (M. Edw.).

2. Pedes tertii sexti septimique crassè cheliformes; secundi minores; primi quarti quinti minimi. Digiti toti uni-articulati.

Anisopus (Templeton).

B. *Antennæ secundæ post primas insitæ, fronte in rostrum productâ.*

1. Pedes decem postici subcheliformes, similes.

Laphystius† (Kröyer).

FAM. III. COROPHIDÆ.

a. *Digiti duo 2-articulati.*

1. Antennæ totæ flagellis confectæ. Caput et segmentum proximum in unum coalita. Pedes quarti, quinti, sextique obsoleti?

Cerapodina (M. Edw.).

2. Antennæ flagellis carentes.

Cerapus (Say).

b. *Digiti nulli 2-articulati.*

* Antennæ inferiores flagellis carentes.

1. Pedes secundi non subcheliformes.

Corophium (Lat.).

2. Pedes primi secundique subcheliformes.

Podocerus† (Leach).

† Antennæ quatuor flagellis gracilibus confectæ.

1. Pedes primi secundique subcheliformes. Antennæ superiores appendiculatæ.

Unciola§ (Say).

2. Pedes primi secundique subcheliformes. Antennæ superiores non appendiculatæ.

Atylus (Leach).

* Tids., iv, 150. "Sextum pedum par ceteris multo longius." "Epimera permagna."

† Tids., iv, 156. "Antennæ sat breves, subulatæ, validæ." "Pes primi paris gracillimus, manu lineari; ungue elongato; pes secundi paris brevis, validus, manu quadrata, ungue sublaminari apice setoso. Reliqui decem pedes validi, subcheliformes, eadem ferme longitudine. Epimera mediocris magnitudinis; quartum par in acumen inferne productum."

‡ The Siphonæcetes of Kröyer (Voy. Scand., etc., 1838-1840, pl. 20, fig. 1; Tids., N. R., i, 481, 1845) differs from *Podocerus* only in having the posterior legs longer than the four preceding. In his description he says, p. 491:—

"Pedes thoracici primi et 2di paris validissimi, manu instructi subcheliformi. Pedes 3tii et 4ti paris articulo primo latissimo, laminari; articulo quarto obcordato, laminari, manum præbente, cujus unguis efficitur articulo quinto subconico articuloque sexto aciculari. Pedes 5ti 6tique paris minutissimi, sed robusti, recurvati, articulo primo clavato, ungue furcato. Pedes 7mi paris graciles, recurvati, articulo primo laminari, ungue minutissimo, furcato. Pedes abdominales 1mi, 2di et 3tii paris natatorii breves validissimi, parte basali latissima, rhomboidali; pedes 4ti, 5tique paris saltatorii, pes abdominalis sexti paris natatorius unica instructus lamina terminali."

§ Glauconome of Kröyer (ibid, pl. 19, fig. 1; Tids., N. R., i, 491, 1845) has the hands and antennæ of *Unciola*. The following is the description, p. 501:—

"Antennæ subpediformes; superiores flagello ornatæ appendiculari perparvo. Oculi minuti, parum distincti. Mandibulæ apex in duos fissus ramos qui dentibus

‡ Antennæ longæ, flagello crasso rigidoque, obsolete articulo.

Antennæ styliformes, rectæ. Pedes filiformes, non prehensiles, sex postici prælongi.

Clydonia (Dana).

FAM. IV. ICILIDÆ.

1. Pedes postici sublamellati.
2. Pedes toti vergiformes, nulli prehensiles.

Pterygocera (Lat.).
Icilius (Dana).

FAM. V. CHELURIDÆ.

Abdomen ad extremitatem crassè styliforme, (segmentis quarto quinto sextoque in articulum styliformem coalitis).

*Chelura** (Philippi).

FAM. VI. DULICHIDÆ.

Caprelliformes. Abdomen 5-articulatum. Segmenta thoracis sextum septimumque coalita.

Dulichia† (Kröyer).

2. *On the Pancreatic Juice*; by M. BERNARD,‡ (L'Institut, No. 791, Feb. 28, 1849.)—Alimentary substances have been arranged by some recent chemists in four groups:—substances soluble by themselves and consequently absorbed directly by the veins and the digestive tube; amylaceous substances converted into sugar; fibrinous matters requiring a special fermentation in order to become soluble; and fatty substances, evidently designed to pass into the chyle and giving it its most decided characters. The recent researches of MM. Bouchardat and Sandras, Mialhe, Bareswill and Bernard himself, have placed beyond doubt the existence of a ferment fitted to change fecula to sugar in some of the liquids which mixed with the aliment. They have shown that the gastric juice has for its primary object the digestion of azotized substances. It remained still to discover the agent operating in the formation of chyle properly so called. M. Bernard argues on the following grounds, suggested by experiments, that this remarkable function belongs to the pancreatic juice.

sunt armati conicis; tuberculus molaris dentibus confertissimis instructus. *Labium superius* breve, depressum latissimum, margine anteriori medio inciso; *labium inferius* quatuor compositum laminis setosis. *Laminæ maxillares* pedum maxillarum dentibus armatæ validis; unguis palpi apice setosus. *Pes primi paris* robustissimus, manu subcheliformi; *pes secundi paris* gracilior, manu carens subcheliformi, pedes 3tii, 4tique paris pergraciles; pedes 5ti, 6ti, 7mique paris graciles femoribus parum dilatatis. Pedes abdominales 1mi 2di et 3tii paris natatorii, breves sed robustissimi; 4ti, 5tique paris saltatorii, validi; 6ti paris fere rudimentares, natatorii. *Epimera* minima fere evanescentia."

* Philippi, Archiv fur Naturg., 1839. Also on *Chelura terebrans*, G. J. Allman, Ann. and Mag. Nat. Hist., xix, 361, June, 1847.

† Kröyer, Tids., N. R., i, 512, 1845, and Voy. Scand., etc., pl. 22, fig. 1, 1a-1n. "Corpus valde elongatum gracili. Antennæ longissimæ (imprimis superiores) subpediformes; superiores flagello instructæ appendiculari. Oculi prominentissimi, acuminati. Pedes 1mi paris compressi, manu (articulo 4to) magna, ungueque biarticulato instructi (qui unguis articulo 5to 6toque junctis efficitur). Pedes 2di paris manu instructi subcheliformi (quæ apud mares maxima est). Pedes 3tii 4tique paris minimi, fere filiformes, invicem ejusdem fermè longitudine et forma. Pedes 5ti 6ti 7mique paris elongati, lineares (femore non dilatato) prehensiles. Sextus thoracis annulus cum septimo coalitus ut difficiliter distinguantur. *Epimera* nulla vel prorsus rudimentaria. Abdomen quinque modo compositum annulis et quinque præditum pedum paribus, quorum tria anteriora natatoria, duo posteriora saltatoria sunt."

‡ See a notice of a previous memoir, in this Journal, vol. vi, p. 276, 1848.